IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	**Confirmation No. 1797**
Mitsuaki OSHIMA et al.	:	Docket No. 2000_1309
Serial No. 09/668,068	:	Group Art Unit 2634
Filed September 25, 2000	:	Examiner A. Le
COMMUNICATION SYSTEM	:	

RESPONSE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

THE COMMISSIONER IS AUTHORIZED TO CHARGE ANY DEFICIENCY IN THE FEES FOR THIS PAPER TO DEPOSIT ACCOUNT NO. 23-0975

Sir:

This paper is in response to the Office Action mailed December 24, 2003, the period for responding to which being extended by three months to June 24, 2004.

The status of the claims is as follows: 1-18 are canceled and 19-24 are pending.

Claims 19-24 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Farias in view of Ooi. This rejection is traversed.

Each of claims 19-24 recites that a **first data stream** is modulated to an **m-level VSB** modulated signal, and that a **second data stream** (after trellis encoding) is modulated to an **n-level VSB** modulated signal, wherein **n>m**. Each of claims 19-24 also recites that the first data stream has "**synchronization data represented by at least one unique word**."

Farias does not disclose or suggest these features, nor would it have been obvious to modify the system of Farias in light of the disclosure of Ooi to result in a system having these features.

It is important to understand the difference between PSK (phase shift keying) modulation (or DPSK or differential phase shift keying) and VSB (vestigial sideband) modulation. In PSK modulation, which is used by Farias, the data is represented by a difference in phase among the

symbols, not by a difference in amplitude. PSK modulation is useful in the system of Farias because the synchronization is accomplished by simply raising the level of the PSK signal for the secondary channel and detecting the higher average energy of the modified PSK signal. See column 9, lines 21-24, and column 15, lines 14-50. PSK is also useful in Farias because the level of the PSK modulated signal is not affected by the data encoded in the signal. The number of peaks and the level of each peak are the same whether the bit is a "one" or a "zero." Thus, the energy level is reliably constant irrespective of the number of "ones" or "zeros" in the data. Moreover, the level of a PSK modulated signal can be raised without affecting the data because the data is encoded by the phase of the signal, not the amplitude. Therefore, the resulting change in amplitude has no bearing on the encoding scheme of the PSK signal because the phases used for the encoding are retained even if the amplitude is raised. Thus, with the PSK modulation, Farias can simply raise the level of the modulated signal for the secondary channel without affecting the manner of decoding the data and provide a reliably constant level that can be easily detected.

In contrast, VSB modulation is a modulation scheme used with AM (amplitude modulation) or ASK (amplitude shift keying) modulation. With VSB modulation, the data is represented by a difference in amplitude among the symbols. In VSB modulation the level of the peaks for a "one" is different than the level of the peaks for a "zero", and thus the average level of the signal varies depending on the number of "ones" and "zeros" in the data. Therefore, the level or average energy of a VSB modulated signal is not reliably constant as with PSK and varies depending on the content of the data represented in the signal.

One cannot simply replace the PSK modulation of Farias with the VSB modulation recited in present claims 19-24 because VSB modulation uses amplitude to encode the data. If the PSK modulation of Farias were replaced by VSB modulation, it would not be possible to reliably detect a different average energy level in the secondary channel of Farias because the average energy level would vary depending on the data in the signal. It is noted that Farias includes various statements that "any number" of modulation techniques can be used. See, e.g., column 10, lines 64-66. However, these general statements can only be considered to refer to

modulation techniques that can be successfully implemented into the system of Farias. VSB modulation is not such a modulation technique.

Farias sets forth a principle of operation of the system in the explanations of the circuitry used to detect this higher energy level. See for example the circuit of Fig. 10, column 8, lines 47-51, column 8, line 65 to column9 line 2, column 19, line 47 to column 20, line 64, column 22, line 60 to column 23, line 10, column 23, lines 30-45, and column 24, lines 20-24. Changing from PSK modulation to VSB modulation would change the principle of operation from detection of the higher average energy level of a PSK modulation signal, since as discussed above such a principle would not be operable or reliable with VSB modulation. "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teaching of the references are not sufficient to render the claims prima facie obvious." MPEP 2143.01, page 2100-127, Rev. 1, Feb. 2003, referring to In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

Furthermore, since there is no disclosure in the prior art of a way to replace the PSK modulated signals of Farias with the n-level and m-level VSB modulated signal of the present invention, and doing so would render the system of Farias inoperable, there is no reasonable expectation that such a modification would be successful. Reasonable expectation of success must be present in the prior art for a modification to be obvious. See In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

It is requested that the Examiner explain how the phase modulation of Farias can be replaced by the m-level VSB and n-level VSB modulated signals recited in claims 19-24 and how the n-level VSB modulated signal (or m-level VSB modulated signal) would be detected as a synchronization signal. In Farias, since the data is represented by phase differences, the level of the secondary channel PSK modulated signal can be reliably controlled irrespective of data content, i.e., raised to a level that is higher than the level of the PSK modulated signal of the main channel. This higher level can be detected as a synchronization signal as shown in Fig. 11B of Farias. With VSB modulated signals, the level of the signal will fluctuate depending on the actual data present in the signal and cannot be reliably detected. There is no explanation in

Farias or the prior art of record as to how such differences in VSB modulation can be handled if VSB were to replace PSK in the system of Farias.

It is also requested that the Examiner explain how such modifications can be made without changing the principle of operation of Farias of reliably detecting the higher average energy of the secondary channel modulated signal and how such modifications can be said to have a reasonable expectation of success. It is submitted that the system of Farias cannot work using VSB modulation and thus there is no reasonable expectation of success in modifying Farias to use VSB modulation. It is also submitted that modifying Farias to use VSB modulation would change a principle of operation of the system of Farias. Accordingly, modifying the system of Farias to replace the PSK modulated signals with n-level and m-level VSB modulated signals as recited in claims 19-24 would not have been obvious.

Claims 19-24 also recite that the first data stream has "**synchronization data represented by at least one unique word**." As discussed above, Farias uses a phase modulation signal with a higher average energy as synchronization. Therefore, the "data" in the secondary channel of Farias does not include "**synchronization data represented by at least one unique word**" as recited in each of claims 19-24. No "data" in the secondary channel of Farias is "synchronization data", and it thus also follows that there is no "unique word" in the secondary channel representing the synchronization data.

Rather, as discussed above, it is the higher energy level of the phase modulation signal of the secondary channel that is used for synchronization in the system of Farias. The higher energy level of the phase modulation signal enables synchronization detection irrespective of the data in the secondary channel. Farias discloses that the "data" in the secondary channel includes "information for controlling, testing, monitoring, configuring the modems, the network and other components of the network" (See column 5, lines 49-51), but does not disclose or suggest that the "data" in the secondary channel includes synchronization data represented by at least one unique code word as recited in each of claims 19-24. Farias thus **teaches away** from including synchronization **data** in the secondary channel because Farias teaches that the higher average energy of the PSK modulation signal of the secondary channel, and **not** the information in the

secondary channel **data**, provides the synchronization. Disclosure in a prior art reference that teaches away from the claimed invention must be considered in making a determination of obviousness. See MPEP 2141.03; and W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983). "It is improper to combine references where the references teach away from their combination." MPEP 2145(X)(D)(2) referring to In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983).

The Examiner relies on Ooi as a secondary reference. Ooi discloses a signal having a plurality of frames, wherein each frame includes a unique synch word. See for example Fig. 2 and the Abstract of Ooi. The Examiner asserts that it would have been obvious to use the teachings of Farias in prior art systems, such as that of Ooi, where it is feasible to use "synch word" to establish frame synchronization. This assertion is simply incorrect because, as shown in Fig. 10, Farias "detects" the synchronization (206), i.e., the higher average energy of the PSK modulation signal, well before the decoding/descrambling (200, 202, 204) is performed. Only after this decoding/descrambling by elements 200, 202, 204 is the "data" of the secondary channel reproduced. Therefore, even if the unique synch word of Ooi were included in the secondary channel data, the unique synch word would not be reproduced until well downstream of the synchronization detection. In the Examiner's proposed combination, the "unique synch word" would presumably be included in the secondary channel data, but the circuitry disclosed by Farias for detecting the synchronization does not even consider the actual data in the secondary channel. Rather, the synchronization detector of Farias detects the higher average energy of the phase modulation signal of the secondary channel well before the data of the secondary channel is decoded.

In view of the above, it is submitted that it would not have been obvious to a person having ordinary skill in art to combine the disclosures of Farias and Ooi in such a way that the inventions recited in claims 19-24 would result. Accordingly it is submitted that claims 19-24 are allowable over the prior art of record.

The Examiner is invited to contact the undersigned by telephone to resolve any remaining issues.

Respectfully submitted,

Mitsuaki OSHIMA et al.

By: _____

Jeffrey R. Filipek
Registration No. 41,471
Attorney for Patentees

JRF/fs
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
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